CLAIMS

What is claimed is:

sub A1 1. A method of analyzing alveolar breath comprising:

expiring breath through an analysis chamber;

continuously monitoring a concentration of a first component of the breath as the breath is expired through the analysis chamber to determine when alveolar breath is in the analysis chamber; and

triggering at least one concentration measurement of a second component of the breath once the alveolar breath is in the analysis chamber.

2. The method of claim 1, wherein continuously monitoring the concentration of the first component of the breath includes monitoring light energy absorbed by the first component.

3. The method of claim 1, wherein triggering the at least one concentration measurement of the second component of the breath includes triggering at least one spectroscopic measurement of the second component.

4. The method of claim 1, wherein triggering the at least one concentration measurement of the second component of the breath includes triggering the at least one concentration measurement when the concentration of the first component crosses a threshold concentration.

5. The method of claim 4, wherein the threshold concentration is at least 3.5% relative concentration of the first component.

6. The method of claim 4, wherein the threshold concentration is at least 4.5% relative concentration of the first component.

7. The method of claim 4, wherein the threshold concentration is set based upon the concentration of the first component in a previously expired breath.

8. The method of claim 1, wherein the first component is carbon dioxide, oxygen, or water vapor.

9. The method of claim 1, wherein the second component is ammonia, nitric oxide, or a carbon dioxide isotope.

10. The method of claim 1, wherein the second component is an element selected from one of the following chemical groups: alcohols, alkanes, and ketones.

11. A method of analyzing alveolar breath comprising:

expiring breath through an analysis chamber;

continuously measuring a concentration of a first component of the breath expired through the analysis chamber;

comparing each measured concentration of the first component to a threshold concentration to determine when alveolar breath is in the analysis chamber; and

triggering at least one concentration measurement of a second component of the breath once the alveolar breath is in the analysis chamber.

12. The method of claim 11, wherein continuously measuring the concentration of the first component of the breath includes monitoring light energy absorbed by the first component.

13. The method of claim 11, wherein the threshold concentration is at least 3.5% relative concentration of the first component.

14. The method of claim 11, wherein the threshold concentration is at least 4.5% relative concentration of the first component.

15. The method of claim 11, wherein the threshold concentration is set based upon the concentration of the first component in a previously expired breath.

16. The method of claim 11, wherein triggering the at least one concentration measurement of the second component of the breath includes triggering at least one spectroscopic measurement of the second component.

17. The method of claim 11, wherein the first component is carbon dioxide, oxygen, or water vapor.

18. The method of claim 11, wherein the second component is ammonia, nitric oxide, or a carbon dioxide isotope.

19. The method of claim 11, wherein the second component is an element selected from one of the following chemical groups: alcohols, alkanes, and ketones.

20. A method of analyzing alveolar breath comprising:

expiring breath through an analysis chamber;

passing light through the breath in the analysis chamber, the light comprising a first wavelength corresponding to a first absorption feature of a first component of the breath;

continuously measuring absorption of the light at the first wavelength by the first component to determine when alveolar breath is present in the analysis chamber; and

triggering at least one concentration measurement of the second component of the breath once the alveolar breath is in the analysis chamber.

21. The method of claim 20, wherein the light further comprises a second wavelength corresponding to a second absorption feature of the second component.

22. The method of claim 21, wherein the light at the first wavelength and the light at the second wavelength follow substantially similar paths in the analysis chamber.

23. The method of claim 21, wherein the light at the first wavelength and the light at the second wavelength are multiplexed prior to entering the analysis chamber.

24. The method of claim 20, wherein triggering the at least one concentration measurement of the second component of the alveolar breath in the analysis chamber includes triggering the at least one concentration measurement when the concentration of the first component crosses a threshold concentration.

25. The method of claim 24, wherein the threshold concentration is at least 3.5% relative concentration of the first component.

26. The method of claim 24, wherein the threshold concentration is at least 4.5% relative concentration of the first component.

27. The method of claim 24, wherein the threshold concentration is set based upon the concentration of the first component in a previously expired breath.

28. The method of claim 20, wherein triggering the at least one concentration measurement of the second component of the breath includes triggering at least one spectroscopic measurement of the second component.

29. The method of claim 20, wherein the first component is carbon dioxide, oxygen, or water vapor.

30. The method of claim 20, wherein the second component is ammonia, nitric oxide, or a carbon dioxide isotope.

31. The method of claim 20, wherein the second component is an element selected from one of the following chemical groups: alcohols, alkanes, and ketones.

32. A method of analyzing alveolar breath comprising:

expiring breath through an analysis chamber;

passing light through the breath in the analysis chamber, the light comprising a first wavelength corresponding to a first absorption feature of a first component of the breath;

continuously calculating a concentration of the first component of the breath by monitoring absorption of the light at the first wavelength by the first component;

comparing each calculated concentration of the first component to determine when alveolar breath is present in the analysis chamber; and

triggering at least one concentration measurement of the second component of the breath once the alveolar breath is in the analysis chamber.

33. The method of claim 32, wherein the light further comprises a second wavelength corresponding to a second absorption feature of the second component.

34. The method of claim 33, wherein the light at the first wavelength and the light at the second wavelength follow substantially similar paths in the analysis chamber.

35. The method of claim 33, wherein the light at the first wavelength and the light at the second wavelength are multiplexed prior to entering the analysis chamber.

36. The method of claim 32, wherein the threshold concentration is at least 3.5% relative concentration of the first component.

37. The method of claim 32, wherein the threshold concentration is at least 4.5% relative concentration of the first component.

38. The method of claim 32, wherein the threshold concentration is set based upon the concentration of the first component in a previously expired breath.

39. The method of claim 32, wherein triggering the at least one concentration measurement of the second component of the alveolar breath in the analysis chamber includes triggering at least one spectroscopic measurement of the second component.

40. The method of claim 32, wherein the first component is carbon dioxide, oxygen, or water vapor.

41. The method of claim 32, wherein the second component is ammonia, nitric oxide, or a carbon dioxide isotope.

42. The method of claim 32, wherein the second component is an element selected from one of the following chemical groups: alcohols, alkanes, and ketones.